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WPA Feasibility Study
MAD Team
Alternative 3 Documentation

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Updates:

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WPA Feasibility Study – Documentation on Alternative 3
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Component: Acme Basin B Discharge
Component: OPE List: A

Alternative 3 Modifications to Alternative 2:

- a) Use existing perimeter canals for both seepage collection and runoff conveyance.
- b) Canal C-26 on southern perimeter will be plugged at eastern and western end and seepage from impoundment will be allowed to move south into Strazzula wetlands. All other seepage returns to impoundment.
- c) During peak storm conditions and runoff events, basin B pumps 375 cfs to the impoundment, when events exceed 375 cfs, additional runoff is directed to C-51 Canal via basin A at a maximum rate of 125 cfs. This route can also be used for impoundment drawdown if there are no unmet LWDD demands and Ag Reserve and LWDD E-1 have no storage capacity.
- d) 100 cfs discharge (pump) to LWDD E-1 canal allowed off-peak via Acme C-25 canal if there is a LWDD demand that can be met or if the Ag Reserve impoundment and the LWDD E-1 canal have capacity. The 100 cfs pump is turned on when the stage in E-1 canal is less than or equal to 15.6 ft NGVD and turned off when the stage is greater than or equal to 15.8 ft NGVD.
- e) 25 MGD capacity ASR used for impoundment drawdown.
ON (inject) when impoundment depth is greater than 1 foot.
OFF when the impoundment depth is less than 1 foot.
- f) The same 25 MGD ASR system is to be used when LWDD demands are needed. Recovery water is to be used to meet LWDD demands before withdrawals from WCA-1 via G-94A, G-94B, or G-94C are made.
- g) 15% of impoundment area will be constructed as a sump with a minimum of 3' water depth at all times and is located adjacent to the inflow pump station.

No changes to:

Impoundment maximum depth (8 feet)
Impoundment maximum inflow pump capacity (375 cfs)

Alternative Summary & Component Description/Modifications:

- Storage calculations:
- NOTE: The GIS coverage impoundment area did not increase although seepage canals were removed which allows the levees to move out and the storage area and volume to increase. Microstation CADD software was used to re-

compute the area to reflect this design change and the new area was computed to be approximately 575 acres.

Impoundment Area: 575 acres
Maximum Depth: 8 feet
Maximum Storage: 4600 acft

Fill rate at 375 cfs: 1.29 ft/day
Time to Fill 8' at 375 cfs: 6.2 days

Drawdown rate at 125 cfs: 0.43 ft/day
Time to Drawdown 8' at 125 cfs: 18.6 days

Drawdown rate with ASR at 162 cfs: 0.56 ft/day
Time to Drawdown 8' at 125 cfs: 14.3 days

Structures:

- 1) (P-OPE-04) 375 cfs pump into impoundment, ON 14.0 ft-NGVD, OFF when impoundment is full or when stage in canal Acme C-25 is 13.0 ft-NGVD
- 2) (P-OPE-09) 100 cfs discharge (pump) to LWDD E-1 canal allowed off-peak via Acme C-25 canal if there is a LWDD demand that can be met or if the Ag Reserve impoundment and the LWDD E-1 canal have capacity. The 100 cfs pump is turned on when the stage in E-1 canal is less than or equal to 15.6 ft NGVD and turned off when the stage is greater than or equal to 15.8 ft NGVD.
- 3) (S-OPE-01) 125 cfs gated culvert to discharge out of impoundment to canal system that connects C-6, C-7, C-8 and C-25, OPEN when required to drawdown impoundment, CLOSED when impoundment reached 1.0' in depth or inflow pump P-OPE-04 is ON
- 4) (S-OPE-10 and 11) Earthen plugs in C-26 at eastern and western boundaries of impoundment to allow seepage from impoundment to move south into Strazzula wetlands.

Levees:

- 1) (L-OPE-01) Impoundment levee on all boundaries, top width 12', side slopes 1V on 3H, height 14' = 8' depth + 6' superiority, average ground 16.2 ft-NGVD, bottom width 96', length 19550', width (east to west) 4875', length (north to south) 4900'

Canals:

- 1) (C-OPE-01) C-25 extension from impoundment to LWDD E-1, bottom width 30', side slopes 1V on 3H, bottom elevation

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8.0 ft-NGVD, average ground 17.0 ft-NGVD, top width 84', length 10820' (note: these dimensions are what was used in Alternative 1 to convey 350 cfs and could be considerably reduced)

Policy Issues, Seepage Issues and/or Questions:

- a) In order for this alternative to work the impoundment must be drawn down to allow storage for subsequent storm events. Prior to and possibly once the Ag Reserve Impoundment coming on-line it may be necessary to send some or all of this discharge to tide. If it is determined that 125 cfs can be routed to STA-1E during off peak than discharging to tide could be eliminated prior to Ag Reserve Impoundment coming on-line. Additional operational flexibility will be provided once the Ag Reserve Impoundment is on-line.

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Component: Strazzula
Component: OPE List: A

Alternative 3 Modifications to Alternative 2:

- a) Seepage from Acme B Basin impoundment encouraged by plugging southern boundary canal (previously mentioned in Acme B).
- b) Slurry wall along northern border from L-40 levee east to western plug of Acme C-26 canal at Acme B impoundment will extend to a depth of -10 ft-NGVD to reduce or eliminate seepage from Strazzula northward to Acme B Basin.
- c) New, 50 cfs capacity pump station located at northwestern corner of Strazzula will be used to prevent low groundwater elevations in northern Strazzula from dropping greater than 1 foot below ground surface if needed. Pump station intake withdraws from L-40 borrow canal and discharges to northern Strazzula providing water quality meets required standards.
ON when the marsh stage in the Refuge at site 1-8T is ≥ 15.8 ft-NGVD and groundwater elevation in Strazzula ≤ 14.8 ft-NGVD
OFF when groundwater elevation in Strazzula ≥ 15.8 ft-NGVD or the marsh stage in the Refuge at site 1-8T is < 15.8 ft-NGVD

Operational Scenarios & Rules: None

- a) Control structure S-STZ-01 is closed and G-94C when L-40 is above 15.8 ft-NGVD, open when L-40 is less than 15.8 and G-94C is closed.

Alternative Summary & Component Description/Modifications:

- Storage calculations:
Wetland Area: 3470 acres

Structures:

- 1) (P-STZ-01) 50 cfs capacity pump station located at northwestern corner of Strazzula will be used to prevent low groundwater elevations in northern Strazzula from dropping greater than 1 foot below ground surface if needed. Pump station intake withdraws from L-40 borrow canal and discharges to northern Strazzula providing water quality meets required standards.

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ON when the marsh stage in the Refuge at site 1-8T is \geq 15.8 ft-NGVD and groundwater elevation in Strazzula \leq 14.8 ft-NGVD

OFF when groundwater elevation in Strazzula \geq 15.8 ft-NGVD or the marsh stage in the Refuge at site 1-8T is $<$ 15.8 ft-NGVD

- 2) (S-STZ-01) 300 cfs gated culverts at eastern boundary of wetlands and on the LWDD L-23W canal
- 3) (N-STZ-01) Slurry wall along northern border from L-40 levee east to western plug of Acme C-26 canal at Acme B impoundment will extend to a depth of -10 ft-NGVD to reduce or eliminate seepage from Strazzula northward to Acme B Basin.

Levees:

- 1) (L-SOPE-01) Eastern boundary berm, top width 2', side slopes 1V on 3H, height 3', average ground 17.0 ft-NGVD, bottom width 20', length 54470'

Canals: None

Policy Issues, Seepage Issues and/or Questions:

No new issues

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Component: Ag Reserve Impoundment/ASR
Component: VV List: B

Alternative 3 Modifications to Alternative 2:

- a) Footprint reduced. Total area = 537 acres.
- b) Maximum depth remains the same (12 feet).
- c) Total maximum storage reduced = 12 feet x 537 acres = 6444 ac-ft.
- d) Total inflow pump rate reduced to 650 cfs. 400 cfs capacity pump station at northern end connected to meander canal and a 250 cfs capacity pump station at the east side connects to LWDD system.
- e) ASR withdrawal is made to meet LWDD demands as needed. Recovery water from Ag Reserve ASR is to be used first then Acme ASR before LWDD makes withdrawals from WCA-1 via G-94A, G-94B, or G-94C.
- f) Seepage collection water is backpumped into the impoundment to maintain acceptable groundwater and canal elevations.
- g) Meandering delivery canal crosses LWDD L-30 by way of a siphon so that the two canals are not hydraulically connected.
- h) Total ASR is 50 MGD. Size optimized to match new reduced footprint.

No change to:

- Canal control elevations
- Meander canal remains the same

Alternative Summary & Component Description/Modifications:

- Storage calculations:

- Impoundment Area: 537 acres
 - Maximum Depth: 12 feet
 - Maximum Storage: 6444 acft
 - Fill rate at 650 cfs: 2.40 ft/day
 - Time to Fill 12' at 650 cfs: 5.0 days

- Drawdown rate at 500 cfs: 1.85 ft/day
 - Time to Drawdown 12' at 500 cfs: 6.5 days

Structures:

- 1) (P-VV-01) 400 cfs pump north of meander canal, ON 16.2 ft-NGVD, OFF 15.5 ft-NGVD
- 2) (P-VV-03) 250 cfs pump into impoundment from southeastern end, ON 16.2 ft-NGVD, OFF 15.5 ft-NGVD

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- 3) (P-VV-04) 200 cfs seepage pumps, ON 16.0 ft-NGVD, OFF 15.9 ft-NGVD
- 4) (P-VV-05) 400 cfs pump into impoundment, ON 16.2 ft-NGVD, OFF 15.5 ft-NGVD
- 5) (S-VV-01) 500 cfs gated culverts discharging from impoundment to LWDD canals
- 6) (S-VV-02) 300 cfs culverts with riser discharging from impoundment to L-40 Borrow Canal

Levees:

- 1) (L-VV-01) Impoundment levee on all boundaries, top width 12', side slopes 1V on 3H, height 15' = 12' depth + 3.0' superiority, average ground 16.0 ft-NGVD, bottom width 102', length 19341'
- 2) (L-VV-02) New levee berm west of SR-7 the length of the northern buffer, top width 2', side slopes 1V on 3H, height 3', average ground 16.0 ft-NGVD, bottom width 20', length 24622'

Canals:

- 1) (C-VV-01) Impoundment seepage canal around perimeter, bottom width 25', side slopes 1V on 4H, bottom elevation 8.0 ft-NGVD, average ground 16 ft-NGVD, top width 89', length 19742'
- 2) (C-VV-02) 400 cfs meandering canal for conveyance to impoundment with littoral zones for F&W habitat, bottom width 46', side slopes 1V on 3H, bottom elevation 7.0 ft-NGVD, average ground 16', top width 100', length 24926'
- 3) (C-VV-03) Conveyance canal from southeastern impoundment boundary to LWDD E-1 canal, bottom width 47', side slopes 1V on 2H, bottom elevation 4.1 ft-NGVD, average ground 16 ft-NGVD, top width 95', length 365'

Policy Issues, Seepage Issues and/or Questions:

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Component: Hillsboro Impoundment/ASR
Component: M List: A (ASR is B list)

Alternative 3 Modifications to Alternative 2:

- a) Impoundment inflow pump station capacity on Hillsboro canal is increased to 1500 cfs and Hillsboro canal conveyance is increased from pump station eastward to LWDD E-2 canal in order to capture additional flows from the LWDD system. Pump station on and off triggers are lowered.
ON when stage in Hillsboro canal is ≥ 7.7 ft-NGVD
OFF when stage in Hillsboro canal drops to 7.0 ft-NGVD or the impoundment is full
- b) Horizontal supply wells are strategically located outside the inside corner of "L" footprint area along Lox Road on the north and east of the North Springs Improvement District right-of-way to reduce seepage into adjacent areas. The total ASR capacity at the site remains the same (150 MGD).
- c) All structures added in Alternative 2 for studying effects of raising the control elevation of LWDD E-1W-S canal on seepage from WCA-1 are removed. Seepage canal elevation is maintained by gravity feed (fixed weir) to Hillsboro canal and backpumping into impoundment.

No change to:

- 500 cfs capacity pump station to direct NSID flows into southern impoundment.
- Total acreage, maximum depth and total storage

Operational Scenarios & Rules:

- a) Pump from Hillsboro into northwest impoundment H1.
- b) Allow gravity flow to the other two compartments (H2 and H3) when elevation 14 ft-NGVD is reached in H1.
- c) Backpump LWDD E-1W-S when canal gets above 12.1 ft-NGVD.

Alternative Summary & Component Description/Modifications:

Impoundments Areas:

- Storage calculations:

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Impoundment	Area (acres)	Depth (ft)	Storage (acft)
H1-northwestern	840	6	5040
H2-northeastern	825	6	4950
H3-southern	585	6	3510
Total	2250	6	13500

Northern Impoundments:

Total Impoundment Area: 1665 acres
Fill/Drawdown rate at 1500 cfs: 1.79 ft/day
Time to Fill/Drawdown 6' at 1500 cfs: 3.4 days

Southern Impoundment:

Total Impoundment Area: 585 acres
Fill/Drawdown rate at 500 cfs: 1.70 ft/day
Time to Fill 6' at 500 cfs: 3.5 days

Structures:

- 1) (P-M-02) 1500 cfs inflow pump into impoundment H1, ON 7.7 ft-NGVD, OFF 7.0 ft-NGVD
- 2) (P-M-04) 500 cfs inflow pump on southern impoundment off of L-36, ON 7.3 ft-NGVD, OFF 7.0 ft-NGVD
- 3) (S-M-01) 700 cfs gated culverts to discharge from impoundment H1 to Hillsboro Canal, 4 - 72" diameter, invert 7 ft-NGVD, length 70'
- 4) (S-M-03) 100 cfs gated culvert discharge from impoundment H1 to H2 impoundment, diameter 72", invert 9.0 ft-NGVD, length 60', weir invert 11.0 ft-NGVD (ground elevation)
- 5) (S-M-04) 3-100 cfs ungated culverts discharge from impoundment H1 to H2 impoundment, diameter 72", invert 9.0 ft-NGVD, length 60', weir invert 15.0 ft-NGVD
- 6) (S-M-05) 3-100 cfs gated culverts discharge from impoundment H1 to H3 impoundment, diameter 72", invert 9.0 ft-NGVD, length 200'
- 7) (S-M-06) 4-150 cfs gated culverts to handle 500 cfs NSID flows if impoundment is full and 100 cfs of impoundment boundary seepage, diameter 72", invert 1.0 ft-NGVD, length 60'
- 8) (S-M-07) 100 cfs gated culvert discharge from impoundment H3 to Hillsboro Canal, diameter 72", invert 7.0 ft-NGVD, length 150'
- 9) (S-M-10) 100 cfs gated culvert for eastern boundary seepage canal, diameter 72", invert 0.0 ft-NGVD, length 60'

Levees:

- 1) (L-M-01) Impoundment levee on eastern boundary north of Hillsboro Canal, top width 12', side slopes 1V on 3.5H, height 12' = 6' depth + 6' superiority, average ground 11.5 ft-NGVD, bottom width 96', length 8000'
- 2) (L-M-02) Impoundment H3 levee on western boundary along existing levee L-36, top width 12', side slopes 1V on 3.5H, height 12' = 6' depth + 6' superiority, average ground 10.0 ft-NGVD, bottom width 96', length 4900'
- 3) (L-M-03) Impoundment H3 levee on southern and eastern boundary, top width 12', side slopes 1V on 3.5H, height 12' = 6' depth + 6' superiority, average ground 11.0 ft-NGVD, bottom width 96', length 9800'
- 4) (L-M-04) Internal levee separating impoundment H1 and H2, top width 12', side slopes 1V on 3H, height 6.5' = 6' depth + 0.5' superiority, average ground 11.5 ft-NGVD, bottom width 51', length 6200'
- 5) (L-M-05) Impoundment levee on southern boundary of impoundment H1 and H2 north of Hillsboro Canal, top width 12', side slopes 1V on 3H, height 9' = 6' depth + 3' superiority, average ground 11.0 ft-NGVD, bottom width 66', length 15750'
- 6) (L-M-06) Impoundment levee on northern boundary of impoundment H3 south of Hillsboro Canal and Lox Road, top width 12', side slopes 1V on 3H, height 9' = 6' depth + 3' superiority, average ground 11.0 ft-NGVD, bottom width 66', length 7620'

Canals:

- 1) (C-M-02) Impoundment H2 seepage canal with littoral zones for F&W habitat on eastern boundary north of Hillsboro Canal, bottom width 5', side slopes 1V on 2H, bottom elevation -5.0 ft-NGVD, average ground 11.5 ft-NGVD, top width 71', length 7670', 29' ROW for littoral zone
- 2) (C-M-03) Pump getaway canal in impoundment H2, bottom width 40', side slopes 1V on 3H, bottom elevation 1.0 ft-NGVD, average ground 11.0 ft-NGVD, top width 100', length 2500'
- 3) (C-M-04) Impoundment H3 seepage canal with littoral zones for F&W habitat on southern and eastern boundary south of Hillsboro Canal, bottom width 26', side slopes 1V on 2H, bottom elevation -5.0 ft-NGVD, average ground 11.0 ft-NGVD, top width 90', length 9750', 30' ROW for littoral zone
- 4) (C-M-05) Improve conveyance of Hillsboro canal from pump station (P-M-02) eastward to LWDD E-2 canal, length 18929'

Alternative Features not Required by Modelers:

- 1) Profile of impoundment levee H2 and seepage canal on eastern boundary north of Hillsboro Canal
250' from east ROW to centerline of levee =
12' east ROW +
29' littoral zone for F&W habitat +
71' top width of seepage canal (bottom -5 NGVD) +
90' ASR, geotechnical toe bench and other (Red Bay tree transplant) +
48' from levee toe to levee centerline
- 2) Profile of impoundment levee and seepage canal on southern and eastern boundary of H3
195' from east ROW to centerline of levee =
12' south and east ROW +
30' littoral zone for F&W habitat +
90' top width of seepage canal (bottom -5 NGVD) +
15' geotechnical toe bench and maintenance ROW
48' from levee toe to levee centerline

Policy Issues, Seepage Issues and/or Questions:

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Component: C-11 Impoundment
Component: Q List: A

Alternative 3 Modifications to Alternative 2:

- a) Total impoundment area remains the same as Alt 2 (1734 acres). The 2 foot maximum depth natural area was modified in Alt 3 and will be allowed to store a maximum of 4' of water for a short period (several days only, excess water is released first from 2' buffer area until stage is 2' deep). The 2 foot area in the northern boundary of Alt 2 is removed so that in Alt 3 the 2 foot area is only along the full length of the eastern boundary.
 - 6 foot deep area = 1281 acres
 - 2-4 foot deep area = 453 acres
 - Total storage = (6' x 1281 acres) + (2' x 453 acres) = 8592 ac-ft
- b) Seepage canal on the eastern boundary has been deepened and widened to improve seepage interception. The eastern seepage canal has also been divided into to two separate reaches operated at different control elevations. The separation point is located at the eastern corner of the seepage canal section that is oriented in an east-west direction. The canal section west and south of this point (C-11 north extension) will have an open connection to C-11 and be controlled at the elevation of C-11 east of the critical project divide structure (S-381). The seepage canal section to the north of the divide point extends and includes the northern boundary and will be controlled at a maximum water surface elevation of 5.0 ft-NGVD, with excess water being gravity fed to the C-11 north extension and backpumped to C-11 impoundment.
- c) Western boundary seepage canal control elevation changed to a maximum of 6.0 ft-NGVD. Seepage pump is turned on at 6.0 ft-NGVD and turned off at 5.5 ft NGVD and will be returned to the impoundment.
- d) The critical project divide structure (S-381) or S-Q-04 allows for seepage into the C-11 Canal west of the structure to be backpumped into WCA-3A by S-9A. Seepage or runoff east of S-381 will be backpumped into the C-11 impoundment and this canal reach can or should be controlled at a maximum elevation of 4.0 ft-NGVD. (Current operations of S-9 - *The pumping station will be operated whenever the water level in the South New River Canal at S-13A exceeds El. 4.0 feet*).

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- e) Dry season flows to S-13A – Source water is the C-11 Impoundment or if the impoundment is dry, then water can be passed through structure S-381 (critical project) to meet demands. The target is to maintain dry season flows at S-13A equal to the 95 Base dry season flows.
- f) Lower the maintained control elevation in C-11 Canal from S-381 west to the S-9 pump station at elevation 5.0 feet NGVD.

No change to:

Triggers for when C-11 impoundment diverts water south to C-9 impoundment via NLBSA.

Design Rational:

- a) Improve seepage control and create a maximum 2' compartment for mitigated wetlands.

Operational Scenarios & Rules:

- a) The 2 foot maximum depth natural area was modified in Alt 3 and will be allowed to store a maximum of 4' of water for a short period (several days only, excess water is released first from 2' buffer area until stage is 2' deep).

Alternative Summary & Component Description/Modifications:

- Storage calculations:

Impoundment	Area (acres)	Depth (ft)	Storage (acft)
Western	1281	6	7686
Eastern	453	2	906
Total	1734		8592

Western Impoundment:

Total Impoundment Area: 1281 acres
Fill rate at 2500 cfs: 3.87 ft/day
Time to Fill 6' at 2500 cfs: 1.5 days

Drawdown rate at 2200 cfs: 3.41 ft/day
Time to Drawdown 6' at 2200 cfs: 1.8 days

Eastern Impoundment:

Total Impoundment Area: 453 acres
Fill rate at 150 cfs: 0.66 ft/day
Time to Fill 2' at 150 cfs: 3.0 days

Structures:

- 1) (P-Q-01) 60 cfs pump for flood protection of mobile home park to backpump into US-27 conveyance canal, ON 6.0 ft-NGVD, OFF 5.0 ft-NGVD
- 2) (P-Q-02) 25 cfs seepage collection pump station for the northern boundary of the impoundment, ON 5.0 ft-NGVD, OFF 4.7 ft-NGVD
- 3) (P-Q-04) 2500 cfs inflow pump station for the C-11 impoundment, ON 4.0 ft-NGVD, OFF 3.0 ft-NGVD
- 4) (P-Q-05) 60 cfs pump for flood protection of FPL substation to backpump into US-27 conveyance canal, ON 6.0 ft-NGVD, OFF 5.5 ft-NGVD
- 5) (P-Q-06) 80 cfs seepage collection pump for western boundary of the impoundment, ON 6.0 ft-NGVD, OFF 5.5 ft-NGVD
- 6) (S-Q-01) 2200 cfs gated spillway discharges from impoundment into the US-27 conveyance canal
- 7) (S-Q-03A) 300 cfs gated culverts discharges from US-27 conveyance canal to C-11 for dry season deliveries
- 8) (S-Q-03B) 2500 cfs gated spillway discharges from US-27 conveyance canal south, allows canal reach to the north to held up when deliveries are not being made
- 9) (S-Q-04) 500 cfs gated culverts discharge from WCA-3A into L-33 conveyance canal to CLBSA
- 10) (S-Q-06) 240 cfs gated culverts discharges from eastern seepage canal to C-11, 3-72" diameter, invert - 2.5 ft-NGVD, length 60'
- 11) (S-Q-07, S-Q-08, and S-Q-09) 50 cfs gated culverts discharges from western impoundment to eastern impoundment, 2-72" diameter, invert 0.0 ft-NGVD, length 60'

Levees:

- 1) (L-Q-01) Impoundment levee around perimeter
 - Length adjacent to 6' impoundment, top width 12', side slopes 1V on 3H, height 11' = 6' depth + 5' superiority, average ground 6.0 ft-NGVD, bottom width 78', length 23283'
 - Length adjacent to 2' impoundment, top width 12', side slopes 1V on 3H, height 5' = 2' depth + 3' superiority, average ground 6.0 ft-NGVD, bottom width 42', length 15350'
- 2) (L-Q-04) Internal levee to between 6' and 2' impoundments, top width 12', side slopes 1V on 3H, height 7' = 6' depth + 1' superiority, average ground 6.0 ft-NGVD, bottom width 54', length 14163'

Canals:

- 1) (C-Q-01) Impoundment seepage canal with littoral zones for F&W habitat on eastern boundary north of S-Q-06, bottom width 20', side slopes 1V on 3H, bottom elevation -2.5 ft-NGVD, average ground 6.0 ft-NGVD, top width 71', length 8314', 30' ROW for littoral zone
- 2) (C-Q-04) Impoundment seepage canal on western boundary, bottom width 10', side slopes 1V on 2H, bottom elevation 0.0 ft-NGVD, average ground 6.0 ft-NGVD, top width 34', length 12843'
- 3) (C-Q-05) Impoundment seepage canal on northern boundary, bottom width 10', side slopes 1V on 2H, bottom elevation 0.0 ft-NGVD, average ground 6.0 ft-NGVD, top width 34', length 6689'
- 4) (C-Q-06) C-11 northern extension and impoundment seepage canal with littoral zones for F&W habitat on eastern boundary south of S-Q-06, bottom width 40', side slopes 1V on 2H, bottom elevation -10.0 ft-NGVD, average ground 6.0 ft-NGVD, top width 104', length 6757', 30' ROW for littoral zone

Alternative Features not Required by Modelers:

- 1) Profile of impoundment levee and seepage canal on eastern boundary north of S-Q-06
150' from east ROW to centerline of levee =
12' east ROW +
30' littoral zone for F&W habitat +
71' top width of seepage canal (bottom -2.5 NGVD) +
16' geotechnical toe bench and maintenance ROW +
21' from levee toe to levee centerline
- 2) Profile of impoundment levee and seepage canal on eastern boundary south of S-Q-06
185' from east ROW to centerline of levee =
12' east ROW +
30' littoral zone for F&W habitat +
104' top width of seepage canal (bottom -10.0 NGVD) +
18' geotechnical toe bench and maintenance ROW +
21' from levee toe to levee centerline

Policy Issues, Seepage Issues and/or Questions:

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Component: C-9 Impoundment/ASR
Component: R List: A

Alternative 3 Modifications to Alternative 2:

- a) Total impoundment area remains the same as Alt 2 (2091 acres). The 2 foot maximum depth natural areas remain the same in Alt 3 but will be allowed to store a maximum of 4' of water for a short period (several days only).
- b) Pumping into the impoundment from the NLBSA will be done by the following conditions:
 - a) Pump ON water supply deliveries are needed to C-9, C-6, C-7, C-4 and C-2 and water level in the NLBSA is above -15.0 feet NGVD. Pump OFF when water deliveries are met.
 - b) Or Pump ON when flows from C-11 are directed to NLBSA and storage is available in C-9 impoundment. Pump OFF when C-11 impoundment diversion is terminated.
 - c) Or Pump ON when the C-9 impoundment depth is zero (to keep area wet). Pump OFF when impoundment returns to one half foot depth.
- c) Water deliveries into 2' impoundment areas will follow a beneficial hydroperiod operation.
- d) Horizontal supply wells for 8 ASR wells (40 MGD) are strategically located in the eastern 2' impoundment area (SB 1672 layout) to reduce seepage into adjacent areas. Water is recovered when stages in C-9 Canal are below 3.5 NGVD and no water is available from the NLBSA. Water will be injected when the impoundment depth is greater than 1 foot and will stop when water in the impoundment is less than 1 foot deep.
- e) Western boundary seepage canal control elevation changed to a maximum of 5.0 ft-NGVD. Seepage pump is turned on at 5.0 ft-NGVD and turned off at 4.5 ft NGVD and will be returned to the impoundment.
- f) Meet C-9 water supply demands with recovery water from the C-9 ASR.

Design Rational:

- a) Improve seepage control and create a maximum 2' compartment for mitigated wetlands.

Operational Scenarios & Rules:

- a) The 2 foot maximum depth natural area was modified in Alt 3 and will be allowed to store a maximum of 4' of water for a short period (several days only, excess water is

released first from 2' buffer area until stage is 2' deep).

Alternative Summary & Component Description/Modifications:

- Storage calculations:

Impoundment	Area (acres)	Depth (ft)	Storage (acft)
Western	1232	6	7392
Eastern	474	2	948
Northern	385	2	770
Total	2091		9110

Western Impoundment:

Total Impoundment Area: 1232 acres
Fill/Drawdown rate at 1000 cfs: 1.61 ft/day
Time to Fill/Drawdown 6' at 1000 cfs: 3.7 days

Eastern Impoundment:

Total Impoundment Area: 474 acres
Fill rate at 150 cfs: 0.63 ft/day
Time to Fill 2' at 150 cfs: 3.2 days

Northern Impoundment:

Total Impoundment Area: 385 acres
Fill rate at 50 cfs: 0.26 ft/day
Time to Fill 2' at 50 cfs: 7.8 days

Structures:

- 1) (P-XX-01) 1000 cfs pump station into C-9 impoundment from NLBSA, ON when -10.0 ft-NGVD with delivery demand, OFF - 10.0 ft-NGVD
- 2) (P-R-01) 100 cfs seepage collection pump station for the western boundary, ON 5.0 ft-NGVD, OFF 4.5 ft-NGVD
- 3) (P-R-02) 100 cfs seepage collection pump station for the eastern boundary, ON 3.0 ft-NGVD, OFF 2.5 ft-NGVD
- 4) (P-R-03) 100 cfs seepage collection pump station for the northern boundary, ON 4.3 ft-NGVD, OFF 4.0 ft-NGVD
- 5) (S-R-01) 1000 cfs gated spillway discharging from the C-9 western impoundment into the C-9 Canal
- 6) (S-R-02) 2500 cfs gated spillway discharging from the US-27 borrow canal into the C-9 Canal
- 7) (S-R-03) Earthen plug in C-9 west of US-27 borrow canal
- 8) (S-R-04) 150 cfs gated culverts discharging from the C-9 eastern impoundment into the C-9 Canal, 3-72" diameter, invert 0.0 ft-NGVD, length 45'

- 9) (S-R-05, S-R-06, and S-R-07) 50 cfs gated culverts discharges from western impoundment to eastern impoundment, 2-72" diameter, invert -2.5 ft-NGVD, length 65'
- 10) (S-R-08) 50 cfs gated culverts discharges from western impoundment to northern impoundment, 2-72" diameter, invert -2.5 ft-NGVD, length 65'
- 11) (S-R-09) 100 gated culverts discharges from western seepage canal into C-9 canal, 2-72" diameter, invert 0.0 ft-NGVD, length 90'

Levees:

- 1) (L-R-01) Impoundment levee around perimeter
 - Length adjacent to 6' impoundment, top width 12', side slopes 1V on 3H, height 11' = 6' depth + 5' superiority, average ground 5.0 ft-NGVD, bottom width 78', length 20975'
 - Length adjacent to 2' impoundment, top width 12', side slopes 1V on 3H, height 5' = 2' depth + 3' superiority, average ground 5.0 ft-NGVD, bottom width 42', length 14320'
- 2) (L-R-03) Internal levee in western impoundment, top width 12', side slopes 1V on 3H, height 7' = 6' depth + 1' superiority, average ground 5.0 ft-NGVD, bottom width 54', length 7350'
- 3) (L-R-04) Internal levee in separating western and eastern impoundments, top width 12', side slopes 1V on 3H, height 7' = 6' depth + 1' superiority, average ground 5.0 ft-NGVD, bottom width 54', length 10340'
- 4) (L-R-05) Impoundment levee around perimeter of northern 2' impoundment, top width 12', side slopes 1V on 3H, height 5' = 2' depth + 3' superiority, average ground 5.0 ft-NGVD, bottom width 42', length 17790'

Canals:

- 1) (C-R-01) Impoundment seepage canal with littoral zones for F&W habitat on eastern and northern boundary up to northern impoundment, bottom width 20', side slopes 1V on 3H, bottom elevation -4.5 ft-NGVD, average ground 5.0 ft-NGVD, top width 77', length 15550', 30' ROW for littoral zone
- 2) (C-R-02) Impoundment seepage canal on western boundary, bottom width 10', side slopes 1V on 2H, bottom elevation 0.0 ft-NGVD, average ground 5.5 ft-NGVD, top width 32', length 18206'
- 3) (C-R-03) Impoundment seepage canal around 2' deep northern impoundment eastern and northern boundary,

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bottom width 10', side slopes 1V on 2H, bottom elevation 0.0 ft-NGVD, average ground 5.0 ft-NGVD, top width 30', length 10120'

Alternative Features not Required by Modelers:

- 1) Profile of impoundment levee and seepage canal on eastern and northern boundary up to northern impoundment
140' from east ROW to centerline of levee =
12' east ROW +
30' littoral zone for F&W habitat +
58' top width of seepage canal (bottom -2.5 NGVD) +
13' geotechnical toe bench and maintenance ROW +
27' from levee toe to levee centerline

Policy Issues, Seepage Issues and/or Questions:

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Component: North Lake Belt Storage Area (NLSBA)
Component: XX List: B

Alternative 3 Modifications to Alternative 2:

- a) The bottom of the rock mined excavated pits will not be excavated or backfilled with solid permeable material and an impermeable bottom will be provided at -35 ft-NGVD. The perimeter curtains walls will tie into the impermeable bottom and extend to a depth of -40 ft-NGVD.
- b) C-11 excess flows and C-9 basin runoff will be directed first into the C-9 Impoundment until full, then the NLBSA and then into the WRAs to maximize storage. C-6 basin runoff will be pumped directly into the NLBSA.
- c) The NLBSA will only be drawn down to -15 feet NGVD. Outflows will be used to maintain C-9, C-7, C-6, C-4, C-2 and Biscayne Bay stages to prevent salt water intrusion. Deliveries to meet Biscayne Bay targets will only be taken from the top 3 to 5 feet of storage in the NLBSA.
- d) Outflows will be directed into the canals and not flow through the WRAs.
- e) South WRA (673 acres) was added and expanded from the D13R footprint to include the south appendage of the NLBSA and will operate in conjunction with the other WRA's surrounding NLBSA.

Storage Comparison:

	Area (acres)	Storage Elev. (ft-NGVD)		Range (ft)	Storage (acft)
		Minimum	Maximum		
D13R	4500	-15.0	5.0	20.0	90,000
Alt1/2	2910	-26.0	5.0	31.0	90,210
Alt3	2910	-15.0	5.0	20.0	58,200

Alternative Summary & Component Description/Modifications:

- Area calculations:
 - Impoundment Area: 2910 acres
 - East WRA: 800 acres
 - West WRA: 445 acres
 - Southwest WRA: 214 acres
 - South WRA: 680 acres
- Seepage curtain calculations:
 - D13R Perimeter: 77270 feet
 - Alternatives 1-3 Perimeter: 46550 feet
 - Perimeter Reduction: 30720 feet/5.82 miles/39.76%

- WRA calculations:

East WRA

Total Impoundment Area: 800 acres

Fill rate at 600 cfs: 1.49 ft/day

Time to Fill 4' at 600 cfs: 2.7 days

West WRA

Total Impoundment Area: 445 acres

Fill rate at 200 cfs: 0.89 ft/day

Time to Fill 4' at 200 cfs: 4.5 days

Southwest WRA

Total Impoundment Area: 214 acres

Fill rate at 100 cfs: 0.93 ft/day

Time to Fill 4' at 100 cfs: 4.3 days

South WRA

Total Impoundment Area: 680 acres

Fill rate at 100 cfs: 0.29 ft/day

Time to Fill 4' at 100 cfs: 13.7 days

Structures:

- 1) (P-XX-01) 1000 cfs pump station from NLBSA into C-9 impoundment, ON above -10.0 ft-NGVD with delivery demand, OFF -10.0 ft-NGVD
- 2) (P-XX-02) 600 cfs inflow pump station from C-9 into NLBSA or East WRA, ON 3.0 ft-NGVD, OFF 2.5 ft-NGVD
- 3) (P-XX-03) 100 cfs pump station from NLBSA into East WRA, ON above -15.0 ft-NGVD with delivery demand, OFF -15.0 ft-NGVD
- 4) (P-XX-04) 300 cfs inflow pump station from C-6 into NLBSA, ON 3.5 ft-NGVD, OFF 3.0 ft-NGVD
- 5) (P-XX-05) 100 cfs pump station from NLBSA into South WRA, ON above -10.0 ft-NGVD with delivery demand, OFF -10.0 ft-NGVD
- 6) (P-XX-06) 150 cfs seepage collection pump station for the South WRA, ON 3.3 ft-NGVD, OFF 3.0 ft-NGVD
- 7) (P-XX-08) 180 cfs seepage collection pump station for the Southwestern WRA, ON 3.5 ft-NGVD, OFF 3.0 ft-NGVD
- 8) (P-XX-09) 100 cfs pump station from NLBSA into Southwestern WRA, ON above -15.0 ft-NGVD with delivery demand, OFF -15.0 ft-NGVD
- 9) (P-XX-10) 180 cfs seepage collection pump station for the Southwestern WRA, ON 3.5 ft-NGVD, OFF 3.0 ft-NGVD

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- 10) (P-XX-11) 200 cfs pump station from NLBSA into West WRA, ON above -10.0 ft-NGVD with delivery demand, OFF - 10.0 ft-NGVD
- 11) (P-XX-12) 200 cfs pump station from C-9 into West WRA, ON above 3.0 ft-NGVD, OFF 2.5 ft-NGVD
- 12) (P-XX-13) 180 cfs seepage collection pump station for the West WRA, ON 3.5 ft-NGVD, OFF 3.0 ft-NGVD
- 13) (S-XX-01) 2000 cfs gated spillway and bridge to pass flows under Krome Avenue
- 14) (S-XX-03) 2500 cfs gated spillway for deliveries of US-27 conveyance to NLBSA
- 15) (S-XX-04) 500 cfs gated culverts on C-9 east of C-9 impoundment
- 16) (S-XX-05) 100 cfs gated culverts for East WRA discharge to C-9
- 17) (S-XX-06) 300 cfs culverts for C-6 delivery to NLBSA
- 18) (S-XX-07) 100 cfs gated culverts for Southwest WRA discharge to C-6
- 19) (S-XX-08) 100 cfs gated culverts for South WRA discharge to C-6
- 20) (S-XX-09) 300 cfs gated culverts for Snapper Creek East delivery to C-2/C-4
- 21) (S-XX-10) 600 cfs gated culverts on C-6 east of Turnpike
- 22) (S-XX-11) 300 cfs gated culverts for C-6 delivery to Turnpike canal
- 23) (S-XX-12) 100 cfs gated culverts for West WRA delivery to C-9
- 24) (S-XX-13) 100 cfs gated culverts for East WRA seepage canal delivery to canal C-XX-07
- 25) (S-XX-14) 300 cfs gated culverts for East WRA delivery to C-6 via canal C-XX-07

Levees:

- 1) (L-XX-01) NLBSA perimeter levee between West WRA and Southwest WRA, top width 8', side slopes 1V on 3H, height 3' = ground elevation + 3' superiority, average ground 5.0 ft-NGVD, bottom width 26', length 4288'
- 2) (L-XX-02) NLBSA perimeter levee on northern boundary, top width 8', side slopes 1V on 3H, height 3' = ground elevation + 3' superiority, average ground 5.0 ft-NGVD, bottom width 26', perimeter length 14537'
- 3) (L-XX-03) Southwest WRA perimeter levee on all boundaries, top width 12', side slopes 1V on 3H, height 7' = 4' depth + 3' superiority, average ground 5.0 ft-NGVD, bottom width 54', perimeter length 19509'

- 4) (L-XX-04) South WRA perimeter levee on all boundaries, top width 12', side slopes 1V on 3H, height 7' = 4' depth + 3' superiority, average ground 5.0 ft-NGVD, bottom width 54', perimeter length 24601'
- 5) (L-XX-05) East WRA perimeter levee on all boundaries, top width 12', side slopes 1V on 3H, height 7' = 4' depth + 3' superiority, average ground 5.0 ft-NGVD, bottom width 54', perimeter length 23680'
- 6) (L-XX-07) NLBSA perimeter levee on southern boundary from Southwest WRA to canal CXX-07, top width 8', side slopes 1V on 3H, height 3' = ground elevation + 3' superiority, average ground 5.0 ft-NGVD, bottom width 26', length 9795'
- 7) (L-XX-08) NLBSA perimeter levee on eastern boundary from East WRA to levee section L-XX-07, top width 12', side slopes 1V on 3H, height 7' = ground elevation + 7' superiority, average ground 5.0 ft-NGVD, bottom width 54', length 5577'
- 8) (L-XX-09) West WRA perimeter levee on all boundaries, top width 12', side slopes 1V on 3H, height 7' = 4' depth + 3' superiority, average ground 5.0 ft-NGVD, bottom width 54', perimeter length 20102'

Canals:

- 1) (C-XX-01) Southwest WRA seepage canal around perimeter boundaries, bottom width 30', side slopes 1V on 3H, bottom elevation -4.0 ft-NGVD, average ground 5.0 ft-NGVD, top width 84', length 16244'
- 2) (C-XX-02) East WRA seepage canal on western boundary, bottom width 20', side slopes 1V on 3H, bottom elevation -4.0 ft-NGVD, average ground 5.0 ft-NGVD, top width 74', length 9000'
- 3) (C-XX-04) Conveyance canal from C-6 to Snapper Creek, bottom width 40', side slopes 1V on 2H, bottom elevation -4.5 ft-NGVD, average ground 5.0 ft-NGVD, top width 78', length 7605'
- 4) (C-XX-05) Conveyance canal from Snapper Creek/C-6 to Snapper Creek South, bottom width 20', side slopes 1V on 2H, bottom elevation -4.5 ft-NGVD, average ground 5.0 ft-NGVD, top width 58', length 19054'
- 5) (C-XX-07) New canal from East WRA to C-6 canal, bottom width 80', side slopes 1V on 2H, bottom elevation -4.0 ft-NGVD, average ground 5.0 ft-NGVD, top width 116', length 17494'
- 6) (C-XX-08) West WRA seepage canal around perimeter boundaries, bottom width 30', side slopes 1V on 3H,

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bottom elevation -4.0 ft-NGVD, average ground 5.0 ft-NGVD, top width 84', length 10220'

- 7) (C-XX-09) East WRA seepage canal on southern boundary, bottom width 30', side slopes 1V on 3H, bottom elevation -4.0 ft-NGVD, average ground 5.0 ft-NGVD, top width 84', length 4699'

Policy Issues, Seepage Issues and/or Questions:

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Component: Central Lake Belt Storage Area (CLBSA)
Component: S List: B

Alternative 3 Modifications to Alternative 2:

- a) The bottom of the rock mined excavated pits will be backfilled with solid permeable material and an impermeable bottom will be provided at -35 ft-NGVD. The perimeter curtains walls will tie into the impermeable bottom and extend to a depth of -40 ft-NGVD.
- b) The CLBSA will only be drawn down to -15 feet NGVD. Prioritization of operations: between +21 feet NGVD to -10 feet NGVD, flows discharge to NESRS and WCA 3B. If water levels are between -10 feet NGVD and -15 feet NGVD, flows discharge only to NESRS.

Dade-Broward Levee and Conveyance Canal

- a) Relocate structure in currently in south-center of (S-BB-04) Dade-Broward Levee Canal south to the northern levee of the C-4 Canal. Control elevation increased to 5.1 feet NGVD.
- b) Dade-Broward Levee and Conveyance Canal is to be held at 5.1 ft-NGVD unless making water supply deliveries to SDCS.

Storage Comparison:

	Area (acres)	Storage Elev.(ft-NGVD)		Range (ft)	Storage (acft)
		Minimum	Maximum		
D13R	5200	-15.0	21.0	36.0	187,200
Alt1/2	3960	-27.0	21.0	48.0	187,380
Alt3	3960	-15.0	21.0	36.0	142,560

Alternative Summary & Component Description/Modifications:

- Area calculations:
Impoundment Area: 3960 acres
WRA Area: 468 acres
- Seepage curtain calculations:
D13R Perimeter: 70470 feet
Alternatives 1-3 Perimeter: 57645 feet
Perimeter Reduction: 12825 feet/2.43 miles/18.20%

■ WRA calculations:

Total Impoundment Area: 468 acres

Fill rate at 800 cfs: 3.39 ft/day

Time to Fill 4' at 800 cfs: 1.2 days

Structures:

- 1) (P-S-01) 1500 cfs inflow pump station to CLBSA impoundment, ON 4.0 ft-NGVD or above in supply canal, OFF 3.5 ft-NGVD or when impoundment reaches 21.0 ft-NGVD
- 2) (P-S-02) 800 cfs pump station from CLBSA into CLBSA STA, ON above -15.0 ft-NGVD with delivery demand, OFF below -15.0 ft-NGVD or no delivery demand
- 3) (S-S-01) 1500 cfs gated spillway discharging from L-33 to C-6
- 4) (S-S-02) 300 cfs gated culverts discharging from Pennsuco Canal to Snapper Creek Protection Canal
- 5) (S-S-03) 800 cfs gated culverts discharging from CLBSA WRA to L-30
- 6) (S-S-06) 300 cfs gated culverts discharging down Turnpike Canal C-XX-05
- 7) (S-BB-01) 3-200 cfs gated culverts for C-6 canal divide structure, diameter 72", invert -3.5 ft-NGVD, length 20'
- 8) (S-BB-02) 1400 cfs gated spillway discharging from C-6 to Dade-Broward Canal
- 9) (S-BB-03) 800 cfs culverts for deliveries from Dade-Broward levee canal to L-30 canal or reverse
- 10) (S-BB-04) 1400 cfs gated spillway on Dade-Broward levee canal
- 11) (S-BB-05) 300 cfs gated culverts discharging from canal C-EEE-02 to Dade-Broward Wellfield protection canal

Levees:

- 1) (L-S-01) CLBSA perimeter levee on all boundaries, top width 12', side slopes 1V on 3H, height 19' = 16' depth + 3' superiority, average ground 5.0 ft-NGVD, bottom width 126', perimeter length 58185'
- 2) (L-S-02) CLBSA WRA perimeter levee on eastern boundary, top width 12', side slopes 1V on 3H, height 5' = 4' depth + 1' superiority, average ground 5.0 ft-NGVD, bottom width 42', length 14052'
- 3) (L-S-03) CLBSA WRA perimeter levee on western and southern boundary, top width 12', side slopes 1V on 3H, height 5' = 4' depth + 1' superiority, average ground 5.0 ft-NGVD, bottom width 42', length 14596'

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- 4) (L-BB-01) Dade-Broward Levee west of canal, top width 10', side slopes 1V on 3H, height 5', average ground 5.0 ft-NGVD, bottom width 40', length 47325'
- 5) (L-BB-02) CLBSA WRA perimeter levee on northern boundary, top width 10', side slopes 1V on 3H, height 5' = 4' depth + 1' superiority, average ground 5.0 ft-NGVD, bottom width 40', length 3185'

Canals:

- 1) (C-S-01) Rerouted Snapper Creek Canal to southern boundary of CLBSA, bottom width 12', side slopes 1V on 1H, bottom elevation -0.0 ft-NGVD, average ground 5.0 ft-NGVD, top width 22', length 15580'
- 2) (C-S-02) CLBSA delivery canal to CLBSA WRA, bottom width 50', side slopes 1V on 3H, bottom elevation -1.0 ft-NGVD, average ground 5.0 ft-NGVD, top width 86', length 4433'
- 3) (C-BB-02) Dade-Broward Levee conveyance canal from C-6 to C-4, bottom width 110', side slopes 1V on 1H, bottom elevation -9.0 ft-NGVD, average ground 5.0 ft-NGVD, top width 138', length 65784'
- 4) (C-EEE-02) Conveyance canal from CLBSA WRA to L-30 canal, bottom width 50', side slopes 1V on 3H, bottom elevation -2.0 ft-NGVD, average ground 5.0 ft-NGVD, top width 92', length 4054'

Policy Issues, Seepage Issues and/or Questions:

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Component: WCA 3A/3B Levee Seepage Management
Component: 0 List: A

Alternative 3 Modifications to Alternative 2:

- a) Control elevation of L-37 borrow canal is lowered to 7.5 ft-NGVD for wet season and 6.5 ft-NGVD for dry season via an operable structure. Also excess water in the marsh north of the C-11 Canal will be allowed to flow into C-11 west of S-381 via another structure it could be backpumped into WCA-3A by S-9A.
- b) Control elevation of the L-33 borrow canal is lowered to 6.5 ft-NGVD for wet season and 5.5 ft-NGVD for dry season.

Alternative Summary & Component Description/Modifications:

- Area calculations:
Total WCA-3A/3B Area: 4565 acres
WCA-3A Seepage Management Area: 1780 acres
WCA-3B Seepage Management Area: 2785 acres

Levees:

- 1) (L-O-01) US-27 conveyance canal levee from C-11 north to US-27/I-75 Interchange, top width 12', side slopes 1V on 3H, height 8', average ground 8.0 ft-NGVD, bottom width 60', perimeter length 31485'
- 2) (L-O-02) US-27 conveyance canal levee from C-11 south to US-27/Krome Avenue intersection, top width 12', side slopes 1V on 3H, height 8', average ground 6.0 ft-NGVD, bottom width 60', perimeter length 44720'
- 3) (L-Q-02) Mobile home perimeter protection levee, top width 12', side slopes 1V on 3H, height 5', average ground 6.0 ft-NGVD, bottom width 42', length 7620'

Policy Issues, Seepage Issues and/or Questions:

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Component: NNR Diversion

Component: List: A

Alternative 3 Modifications to Alternative 2:

No change from Alternative 1 or 2

Component: Eastern C-4 Divide Structure

Component: T List: A

Alternative 3 Modifications to Alternative 2:

No change from Alternative 1 or 2

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Component: Bird Drive Recharge Area
Component: U List: A

Alternative 3 Modifications to Alternative 2:

- a) The total impoundment area is increased by adding land to the south. An internal levee will create a deeper area along the northern and western footprint where the maximum water depth will be 4 feet. The eastern area will be maintained at a maximum water depth of 1 foot.

4 foot depth area = 1510 acres

1 foot depth area = 2370 acres

Total storage = 4' x 1510 acres = 6040 ac-ft

NOTE: These areas differ from the GIS coverages and were computed using Microstation CADD software by COE. The difference occurs due to the GIS coverage includes full modeling cell areas of dimension 500' x 500' which extend another approximately 400' past the internal levee.

NOTE: 1 foot depth area should not be counted as storage and is designed to receive all input from direct rainfall or seepage from adjacent deep area. Excess above 1 foot is removed and backpumped into 4 foot deep area.

- b) All C-4 backpumping, re-use and seepage pumping are discharged into 4' depth area. C-4 Canal will be backpumped down to elevation 4.0 feet NGVD.
- c) Re-use is returned to D13R quantity with the Miami-Dade monthly distribution and directed into the 4-foot deep area.
- d) The 4-foot area discharges to the SDCS at a maximum rate of 200 cfs if SDCS has demands.

Alternative Summary & Component Description/Modifications:

- Area calculations:

4 foot depth area = 1510 acres

1 foot depth area = 2370 acres

Total storage = 4' x 1510 acres = 6040 ac-ft

NOTE: These areas differ from the GIS coverages and were computed using Microstation CADD software by COE. The difference occurs due to the GIS coverage includes full modeling cell areas of dimension 500' x 500' which extend another approximately 400' past the internal levee.

Fill rate at 595 cfs: 0.78 ft/day

Time to Fill 4' at 595 cfs: 5.1 days

NOTE: 595 cfs is equal to 300 cfs seepage return plus 200 cfs C-4 backpumping and 95 cfs re-use pumping.

Drawdown rate at 200 cfs: 0.26 ft/day
Time to Drawdown 4' at 200 cfs: 15.2 days

Structures:

- 1) (P-U-01) 800 cfs pump station for SDCS deliveries when required from C-4 to relocated L-31N
- 2) (P-U-02) 200 cfs pump station for inflow from C-4 to 4 foot deep impoundment, ON 4.5 ft-NGVD, OFF 4.0 ft-NGVD
- 3) (P-U-03) 150 cfs seepage collection pump station for the eastern boundary, ON 5.8 ft-NGVD, OFF 5.3 ft-NGVD
- 4) (P-U-04) 150 cfs seepage collection pump station for the southern boundary, ON 5.8 ft-NGVD, OFF 5.3 ft-NGVD
- 5) (P-HHH-01) 95 cfs re-use pumping
- 6) (S-U-01) 2-100 cfs gated culverts discharging from the 4 foot deep impoundment into the SDCS
- 7) (S-U-02) 2-150 cfs gated culverts on C-1W to replace S-338 that is removed.
- 8) (S-U-04) 2-25 cfs gated culverts discharging from the 2 foot deep impoundment into the SDCS

Levees:

- 1) (L-U-01) Impoundment levee around perimeter
 - Length adjacent to 4 foot deep impoundment, top width 12', side slopes 1V on 3H, height 7' = 4' depth + 3' superiority, average ground 5.2 ft-NGVD, bottom width 54', length 35156'
 - Length adjacent to 1' impoundment, top width 12', side slopes 1V on 3H, height 5' = 2' depth + 3' superiority, average ground 5.2 ft-NGVD, bottom width 42', length 26400'
- 2) (L-U-02) Impoundment internal levee, top width 12', side slopes 1V on 3H, height 7' = 4' depth + 3' superiority, average ground 5.2', bottom width 54', length 26337'

Canals:

- 1) (C-U-01) Conveyance and seepage collection canal from C-4 to L-31N-E, bottom width 90', side slopes 1V on 1H, bottom elevation -4.0 ft-NGVD, average ground 5.2 ft-NGVD, top width 108', length 29400'
- 2) (C-U-02) Conveyance canal from impoundment to C-1W, bottom width 90', side slopes 1V on 1H, bottom elevation -4.0 ft-NGVD, average ground 5.2 ft-NGVD, top width 108', length 16619'

Policy Issues, Seepage Issues and/or Questions: